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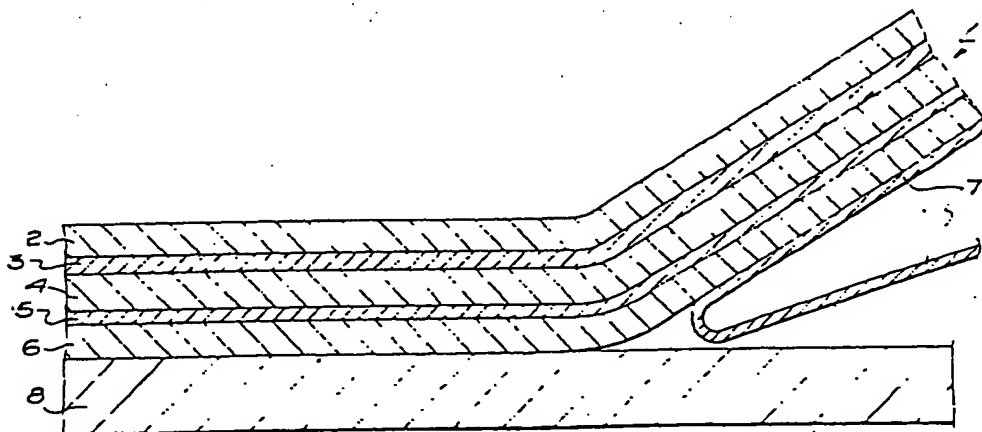
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(54) **Security sealing tape using holograms**

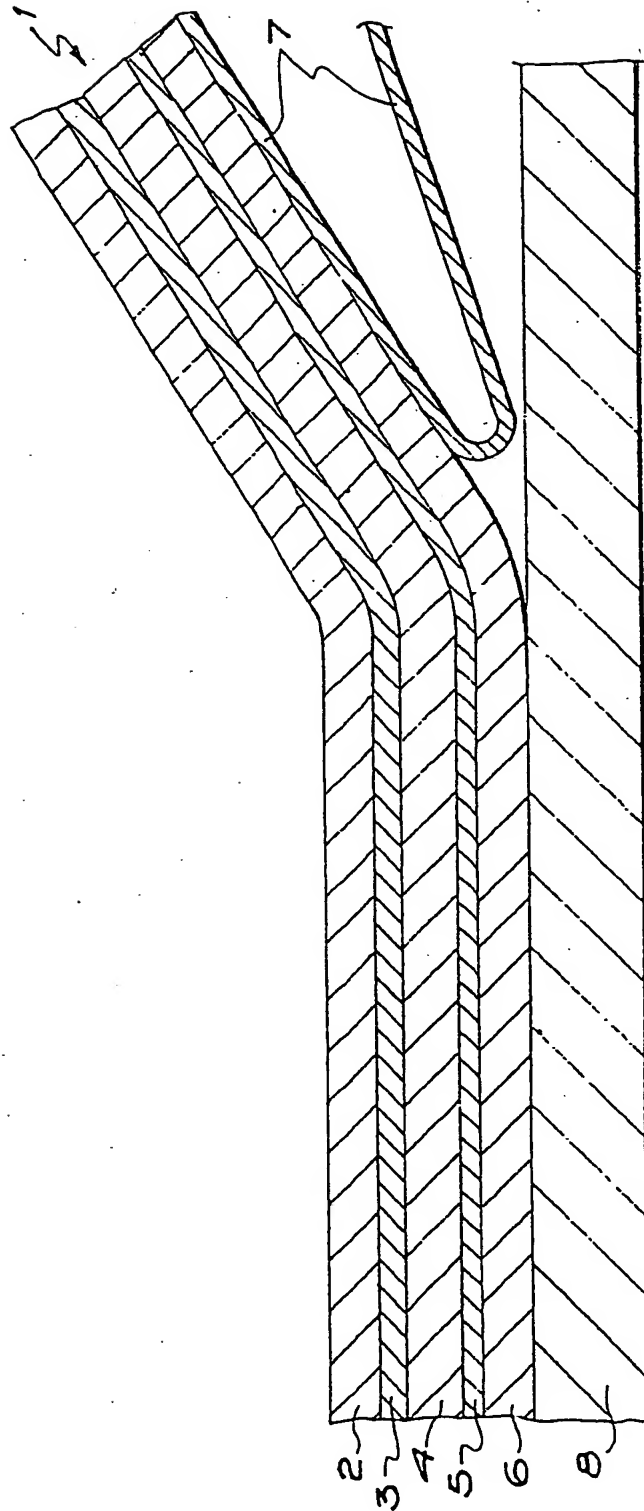
(57) The security sealing tape (1) comprises the following layers: a transparent film carrier (2); a wax release coat (3); a lacquer coat (4); a layer of aluminium (5); an adhesive layer (6); and a wax release paper layer (7). The wax release layer is removed when the tape is applied to a substrate (8). The substrate is constituted by two parts which it is desired to protect against being moved by unauthorized persons, e.g. a door and door frame. The carrier layer may be of polyester which is then provided with a wax release coat. The release coat is overlaid by a polymer layer, optionally metallised. A holographic pattern is applied to the lacquer layer before metallising. An adhesive layer is provided to stick the security tape on objects to be secured. Attempted tampering damages the holographic layer.



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**"IMPROVEMENTS IN SECURITY SEALING TAPE"**

The present invention relates to security sealing tape which can be used to seal doors, windows, cabinets, bags and files, so that if unauthorized entry has been made this can be readily detected.

5 In particular the type of security sealing tape which this application is concerned with utilizes visible holographic information in two or three dimensions.

Holographic hot-stamping foil is well known in the art and is currently utilized in cheque  
10 guarantee cards. The foil is applied to the cards by means of a hot-stamping machine, with the aid of a carrier and adhesive. Once the foil has been applied, the carrier is removed. In this case of  
15 the cheque guarantee cards, the adhesive is a very thin layer which is permanent. If the film is tampered with the holographic information will be destroyed. The application of the foils to cheque guarantee cards cannot be done by hand or "in the  
20 field", and moreover has to be applied to a very smooth continuous surface, and cannot be applied across a split gap in the substrate. Accordingly, its application is limited to such items as cheque guarantee cards, and cannot be adapted to be used

for sealing doors, windows, drawers, bags, files and other like entrances or containers.

Whilst materials do exist which contain macroscopic information in non-holographic form (e.g. graphics) in a wax release layer, and thus might be suitable for the wider field of application envisaged by the present invention they do have disadvantages, which makes their use unsuitable. They are however capable of detecting unauthorized tampering since some of the aluminium which is contained within the material which displays the macroscopic information remains on the carrier whilst some remains on the substrate making it possible to detect unauthorized tampering or attempted removal. However, this type of macroscopic information is relatively easy to copy which makes it easy for the professional criminal or spy to gain entry into restricted areas or access to confidential documents without being readily detected.

It is therefore an object of the present invention to overcome the above referred to disadvantages.

According to the present invention there is provided a security sealing tape comprising a plurality of layers which at least include: a transparent upper carrier layer; a layer on which a holographic pattern or information is imparted; a

release layer juxtaposed between the above two layers;  
and an adhesive layer which enables the tape to be  
bonded to surfaces to effect sealing of an entrance  
to an area or container, the juxtaposed release  
5 layer exhibiting weaker adhesive properties than  
the adhesive layer.

Preferably, a wax release paper layer is  
applied to the adhesive layer to enable the sealing  
tape to be stored prior to use.

10 The carrier layer may be a polyester film  
and the layer on which a holographic pattern or  
information is imparted may be a lacquer coat.

A layer of aluminium may be applied over  
the lacquer coat by vacuum deposition.

15 Owing to the weaker adhesion properties  
of the juxtaposed bonding layer, any unauthorized  
tampering or attempted removal of the tape will be  
readily evident as the holographic image becomes  
distorted or totally destroyed.

20 The present invention will now be described  
in greater detail by way of example with reference  
to the accompanying drawing, wherein the sole figure  
is a diagrammatic representation of one preferred  
form of security sealing tape being applied to a  
25 substrate.

The security sealing tape 1 when manufac-

tured comprises a plurality of layers 2 to 7. The layers of the sealing tape 1 are constituted as follows:-

- (a) a transparent plastic film carrier 2;
- 5 (b) a wax release coat 3;
- (c) a lacquer coat 4;
- (d) a layer of aluminium 5 which is applied by vacuum deposition;
- (e) an adhesive layer 6; and
- 10 (f) a wax release paper layer 7, which is in fact removed when the security sealing tape is applied to a substrate 8.

The substrate 8 may be constituted by two parts which it is desired to protect against being  
 15 moved apart by unauthorized persons. For example, the substrate may comprise any one or more of the following:

- (a) a door and door frame;
- (b) a window and window frame;
- 20 (c) a cabinet drawer and surrounding frame.
- (d) the two parts of a bag or case which allow it to be opened; and
- (e) a file or envelope and its sealing cover.

Thus it will be appreciated that the substrate 8 may  
 25 comprise two parts which may be removable with respect to one another in order to gain entry or



access into an area which it is desired to protect from unauthorized personnel.

One preferred method of manufacturing the security sealing tape will now be described in greater detail. The plastic film carrier 2 is solvent coated with a thin layer of wax constituting the wax release coat 3. The film carrier 2 is preferably a polyester film in the range of 20 to 30  $\mu\text{m}$  thick, preferably 25  $\mu\text{m}$  thick. The lacquer coat 4 which is somewhat thicker than the coat 3 is then coated over the wax release coat 3 by means of solvent coating. Next, the thin layer of aluminium 5 is applied to the lacquer coat 4 by vacuum deposition in order to produce a highly reflective surface. The resulting composite foil, which at this stage in manufacture comprises layers 2 to 5, is passed through a hot embossing process which imparts a very high optical frequency holographic relief pattern on the surface of the lacquer coat 4 which has been covered by the thinly coated aluminium layer 5. The embossed surface is then coated with the adhesive layer 6 which is pressure sensitive, by means of roll coating. Finally the wax release paper 7 is applied to the pressure sensitive adhesive layer 6 which enables the thus manufactured security sealing tape to be stored awaiting use.

The holographic pattern, which is a preselected pattern for application to the security sealing tape, causes strong optical diffraction effects when the foil

viewed from above, i.e. through the plastic film carrier

2. Various forms of information or patterns may be stored in holographic two-dimensional or three-dimensional form.

When it is desired to use the security sealing tape in order to protect an area e.g. a room, or a container, e.g. a bag, the wax release paper layer 7 is peeled away in order to expose the pressure sensitive adhesive layer 6. In the case of a door, the sealing tape is then applied around the door and door frame, so that one longitudinal edge of the strip makes contact with the door itself and the other longitudinal edge makes contact with the door frame. When the security sealing tape 1 has been applied using slight pressure to ensure adhesion to the door and frame, the holographic information or pattern will be clearly visible through the film carrier 2 in natural daylight or artificial illumination in the form of normal room lighting.

For further protection the seal may be individually numbered or signed by the person authorized to apply the seal.

If now the tape is tampered with, either by attempting to open the door or by attempting to peel the tape off the door and door frame, the film carrier 2 becomes released or partly released from the lacquer coat 4 and as a result the holographic information or pattern becomes distorted or is totally destroyed. The destruction or damage to the holographic image occurs because the bond between the layers 2 and 4 is considerably weaker

than the bond between the layers 4, 5 and 7.

Under no circumstances can the film carrier be made to return to its former position once an attempt has been made to break the seal. Thus the only way a professional criminal or spy can avoid detection is by replacing the security sealing tape, with an identical new strip of tape.

Thus it will be appreciated that the above described security sealing tape, which contains visible holographic information in two or three dimensions, once applied to seal an area or container, can readily indicate on inspection whether unauthorized personnel have attempted to enter the area or container. The tape can be supplied in a form that can be used "in the field" or in a factory or office. As mentioned above one use is to seal doors or drawers in a building which has been searched for security purposes. In this way searching can be done in a serial manner over a long period of time. Once sealed the state of the security can be quickly checked by visual examination of each seal. Another use is to seal courier bags which must not be opened in transit. The seal can be made by hand once the bag has been filled. If it has been opened in transit this will be obvious on arrival.

CLAIMS:-

1. A security sealing tape comprising a plurality of layers which at least include:-

(a) a transparent upper carrier layer;

5 (b) a layer on which a holographic pattern or information is imparted;

(c) a release layer juxtaposed between the above two layers; and

10 (d) an adhesive layer which enables the tape to be bonded to surfaces to effect sealing of an entrance to an area or container. The juxtapose release layer exhibiting weaker adhesive properties than the adhesive layer.

2. A security sealing tape according to claim 1, additionally including a wax release paper which is applied  
15 to the adhesive layer to enable the sealing tape to be stored prior to use.

3. A security sealing tape according to claim 1 or 2, wherein the carrier layer is a polyester film.

4. A security sealing tape according to any one of the  
20 preceding claims, wherein the layer or which a holographic pattern or information is imparted is a lacquer coat.

5. A security sealing tape according to claim 4, wherein a layer of aluminium is applied over the lacquer coat by

vacuum deposition.

6. A security sealing tape including a plurality of layers as follows:-

- (a) a transparent plastic film carrier;
- 5 (b) a wax release coat;
- (c) a lacquer coat;
- (d) a layer of aluminium which is applied by vacuum deposition;
- (e) an adhesive layer;
- 10 (f) a wax release layer which is removed when the tape is applied to a substrate.

7. A security sealing tape according to claim 6, when applied to a substrate, wherein said substrate is constituted by two parts which it is desired to protect  
15 against being moved by unauthorized persons.

8. A security sealing tape according to claim 7, wherein said substrate to which the tape has been applied comprises one or more of the following:-

- (a) a door and door frame;
- 20 (b) a window and window frame;
- (c) a cabinet drawer and surrounding frame;
- (d) the two parts of a bag or case which allow it to be opened; and
- (e) a file or envelope and its sealing cover.

9. A method of manufacturing a security sealing tape comprising a plurality of layers, including the steps of:-

(a) solvent coating a plastic film carrier with a thin layer of wax to constitute a wax release coat;

5 (b) coating a lacquer coat over the wax release coat by means of solvent coating;

(b) applying a thin layer of aluminium to the lacquer coat by vacuum deposition;

(d) hot embossing the resulting composite foil; and

10 (e) coating the embossed surface of the foil with an adhesive layer.

10. The method according to claim 9, wherein the film carrier is a polyester film in the range of 20 to 30  $\mu\text{m}$  thick.

15 11. A security sealing tape constructed substantially as herein described with reference to and as illustrated in the accompanying drawing.